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Substitute for form 1449A/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 3

### Complete if Known

Application Number	09/307,023
Filing Date	May 7, 1999
First Named Inventor	Salcudean et al.
Art Unit	2673
Examiner Name	K. Chang
Attorney Docket Number	IMM1P066.RE

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### U.S. PATENT DOCUMENTS

Examiner	Cite No. <sup>1</sup>	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
KE	AA	3,220,121		11/30/1965	Cutler	
KE	AB	3,517,446		6/30/1970	Corlyon et al.	
KE	AC	3,623,064		11/23/1970	Kagan	
	AD	3,903,614		9/9/1975	Diamond et al.	
	AE	4,236,325		10/2/1980	Hall et al.	
	AF	4,513,235		4/23/1985	Acklam et al.	
	AG	4,599,070		7/8/1986	Hladky et al.	
	AH	4,708,656		11/24/1987	De Vries et al.	
	AI	4,713,007		12/15/1987	Alban	
	AJ	4,794,392		12/27/1988	Selinko	
	AK	4,891,764		1/2/1990	McIntosh	
	AL	5,019,761		5/28/1991	Kraft	
	AM	5,022,407		6/11/1991	Horch et al.	
	AN	3,157,853		11/17/1964	Hirsch	
	AO	3,497,668		2/24/1970	Hirsch	
	AP	3,902,687		9/2/1975	Hightower	
	AQ	4,160,508		7/10/1979	Salsbury	
	AR	4,581,491		4/8/1986	Boothroyd	
	AS	4,930,770		6/5/1990	Baker	
	AT	4,934,694		6/19/1990	McIntosh	
	AU	5,035,242		7/30/1991	Franklin et al.	
	AV	5,038,089		8/6/1991	Szakaly	
KE	AW	5,078,152		1/7/1992	Bond et al.	

### FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup>	Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				
KE	AX	EP	EP0349086	1/3/1990	Visser		<input type="checkbox"/>

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Kent Chang

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12/19/06

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<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Kind Codes of U.S. Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 3

### Complete If Known

Application Number 09/307,023  
Filing Date May 7, 1999  
First Named Inventor Salcudean, S., et al.  
Art Unit 2673  
Examiner Name K. Chang  
Attorney Docket Number IMM1P066.RE

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### OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
KC	AY	BAIGRIE, "Electric Control Loading - A Low Cost, High Performance Alternative," Proceedings, pp. 247-254, November 6-8, 1990.	
	AZ	BROOKS et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11; NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985.	
	BA	JONES et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-158, 1990.	
	BB	SNOW et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. MPO-17851; JPL Case No. 5348, pp. 1-4, 06/15/1989.	
	BC	OUH-YOUNG, "Force Display in Molecular Docking," Order No. 9034744, p. 1-369, 1990.	
	BD	TADROS, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators, MIT Archive © Massachusetts Institute of Technology, pp. 1-88, February 1990.	
	BE	GOTOW et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11:00, pp. 332-337, June, 1989.	
	BF	STANLEY et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992.	
	BG	RUSSO, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992.	
	BH	PATRICK et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui J. deFigueiredo et al., Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990.	
	BI	ADELSTEIN, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989.	
	BJ	BEJCZY, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980.	
	BK	BEJCZY, "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM-IFTOMM, Sep. 8-12, 1981.	
KC	BL	MCAFFEE, "Teleoperator Subsystem/Teleoperator Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL 1988.	

Examiner  
Signature

*Kent Chang*

Date

Considered

12/19/06

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Substitute for form 1449B/PTO		<b>Complete If Known</b>			
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)		Application Number	09/307,023		
		Filing Date	May 7, 1999		
		First Named Inventor	Salcudean, S., et al.		
		Art Unit	2673		
		Examiner Name	K. Chang		
Sheet	3	of	3	Attorney Docket Number	IMM1P066.RE

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OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
KC	BM	SHIMOGA, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30 - Oct. 1, 1992.	
	BN	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990.	
	BO	TERRY et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988.	
	BP	HOWE, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992.	
	BQ	RABINOWITZ et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contactor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987.	
	BR	BEJCZY et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980.	
	BS	BEJCZY et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989.	
KC	BT	BEJCZY, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987.	

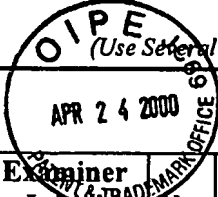
Examiner Signature	<i>Kent Chang</i>	Date Considered	12/19/06
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<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	<b>Atty Docket No.:</b> IMM1P066.RE	<b>Application No.:</b> 09/307,023
	<b>Applicant:</b> Salcudean, et al.	
	<b>Filing Date:</b> 5/7/99	<b>Group:</b> 2778 Group 2700



### U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date
KC	A	3,863,098	1/28/75	Mehr	315	367	2/23/73
KC	B	4,148,014	4/3/79	Burson	340	709	4/6/77
KC	C	4,398,889	8/16/83	Lam, et al.	434	45	6/8/81
KC	D	4,477,043	10/16/84	Repperger	244	223	12/15/82
KC	E	4,603,284	7/29/86	Perzley	318	568	6/5/84
KC	F	4,604,016	8/5/86	Joyce	414	7	8/3/83
KC	G	4,632,341	12/30/86	Repperger, et al.	244	230	2/6/85
KC	H	4,712,101	12/8/87	Culver	340	710	12/4/84
KC	I	4,734,685	3/29/88	Watanabe	340	710	7/18/84
KC	J	4,782,327	11/1/88	Kley, et al.	340	365 P	1/2/85
KC	K	4,795,296	1/3/89	Jau	414	5	11/17/86

### Foreign Patent or Published Foreign Patent Application

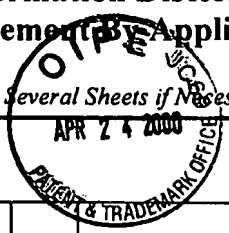
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation Yes	No
KC	L	0 085 518 A1	8/10/83	European	--	--	X	
KC	M	0 265 011 A1	4/27/88	European	--	--	X	
KC	N	0 607 580 A1	7/27/94	European	--	--	X	
KC	O	WO 92/00559	1/9/92	PCT	--	--	X	
	P							

### Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
KC	R	Fischer, et al., "Specification and Design of Input Devices for Teleoperation," CH2876-1/90/0000, pp. 540-545, IEEE, May, 1990.
KC	S	Kotoku, Tetsuo, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of the IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992, pp. 239-246.
KC	T	Jacobsen, et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Feb. 1991, pp. 1-15.
<b>Examiner:</b> Kent C. [Signature]		<b>Date Considered:</b> 8/11/00

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement by Applicant</b>  <i>(Use Several Sheets if Necessary)</i>	<b>Atty Docket No.:</b> IMM1P066.RE	<b>Application No.:</b> 09/307,023
	<b>Applicant:</b> Salcudean, et al.	
	<b>Filing Date:</b> 5/7/99	<b>Group:</b> 2700



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**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date
KC	A	4,800,721	1/31/89	Cemenska, et al.	60	393	2/13/87
KC	B	4,823,634	4/25/89	Culver	74	471 XY	11/3/87
KC	C	4,861,269	8/29/89	Meenen, Jr.	434	45	3/30/88
KC	D	4,879,556	11/7/89	Duimel	341	20	10/26/87
KC	E	4,925,312	5/15/90	Onaga, et al.	364	513	3/21/88
KC	F	4,935,728	6/19/90	Kley	340	709	11/20/87
KC	G	4,961,038	10/2/90	MacMinn	318	696	10/16/89
KC	H	4,983,901	1/8/91	Lehmer	318	685	4/21/89
KC	I	5,007,300	4/16/91	Siva	74	471 XY	1/22/90
KC	J	5,095,303	3/10/92	Clark, et al.	340	710	3/27/90
KC	K	5,107,080	4/21/92	Rosen	200	6 A	12/1/89

**Foreign Patent or Published Foreign Patent Application**

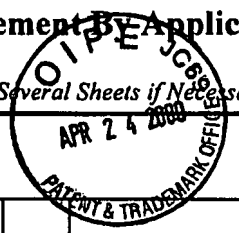
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation Yes	No
	L							
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	P							

**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
KC	R	Kotoku, et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE/RSJ Int'l Workshop on Intelligent Robots and Systems, Nov. 1991, pp. 999-1004.
KC	S	Howe, et al., "Task Performance with a Dextrous Teleoperated Hand System," Proc. of SPIE, Vol. 1883, Boston, Nov. 1992, pp. 1-9.
KC	T	Adelstein, et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," MIT, 1992, pp. 108-112.
<b>Examiner:</b> <i>Kent Clay</i>		<b>Date Considered:</b> 8/11/00

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	<b>Applicant:</b> Salcudean, et al.	
	<b>Filing Date:</b> 5/7/99	<b>Group:</b> 2718 2700



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**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date
KC	A	5,116,180	5/26/92	Fung, et al.	414	5	5/3/90
KC	B	5,142,931	9/1/92	Menahem	74	471 XY	2/14/91
KC	C	5,184,319	2/2/93	Kramer	364	806	2/2/90
KC	D	5,186,629	2/16/93	Rohen	434	114	8/22/91
KC	E	5,193,963	3/16/93	McAfee, et al.	414	5	10/31/90
KC	F	5,203,563	4/20/93	Loper III	273	148 B	3/21/91
KC	G	5,228,356	7/20/93	Chuang	74	471 XY	11/25/91
KC	H	5,264,768	11/23/93	Gregory, et al.	318	561	10/6/92
KC	I	5,275,565	1/4/94	Moncrief	434	29	2/23/93
KC	J	5,296,846	3/22/94	Ledley	345	161	10/5/92
KC	K	5,298,890	3/29/94	Kanamaru, et al.	345	157	4/10/91

**Foreign Patent or Published Foreign Patent Application**

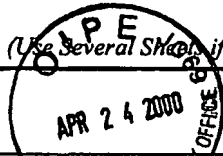
Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation Yes	No
	L							
	M							
	N							
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
KC	R	Ouh-young, et al., "Using A Manipulator For Force Display In Molecular Docking," CH2555-1/88/0000, IEEE, pp. 1824-1829, April, 1988.
KC	S	Winey III, Calvin McCoy, "Computer Simulated Visual and Tactile Feedback As An Aid to Manipulator and Vehicle Control," Dept. of Mech. Eng., MIT, May 1981, pp. 1-79.
KC	T	Adelstein, et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research," NASA-Ames Research Center, Dept. of Mech. Eng., MIT, 1992, pp. 1-26.
<b>Examiner:</b> Kent C. [Signature]		<b>Date Considered:</b> 8/11/00

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	<b>Applicant:</b> Salcudean, et al.	
	<b>Filing Date:</b> 5/7/99	<b>Group:</b> 2778



### U.S. Patent Documents

Examiner Initial	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date
KC	A 5,389,865	2/14/95	Jacobus, et al.	318	568.11	12/2/92
KC	B 5,459,382	10/17/95	Jacobus, et al.	318	568.11	6/9/94
KC	C 5,471,571	11/28/95	Smith, et al.	395	137	7/17/92
KC	D 5,576,727	11/19/96	Rosenberg, et al.	345	179	6/5/95
KC	E 5,589,828	12/31/96	Armstrong	341	20	3/5/92
KC	F 5,629,594	5/13/97	Jacobus, et al.	318	568.11	10/16/95
KC	G 5,691,898	11/25/97	Rosenberg, et al.	364	190	3/28/96
KC	H 5,701,140	12/23/97	Rosenberg, et al.	345	156	7/12/94
KC	I 5,721,566	2/24/98	Rosenberg, et al.	345	161	6/9/95
KC	J 5,734,373	3/31/98	Rosenberg, et al.	345	161	12/1/95
KC	K 5,739,811	4/14/98	Rosenberg, et al.	345	161	9/27/95

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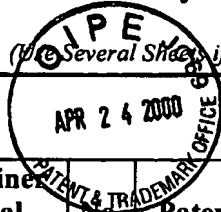
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	L							
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KC	R	Russo, Massimo Andrea, "The Design and Implementation of a Three Degree-of-Freedom Force Output Joystick," Dept. of Mech. Eng., May 1990, pp. 1-33.
KC	S	Bejczy, et al., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay," Jet Propulsion Lab., CH2876-1/90/0000, IEEE, pp. 546-550, May, 1990.
KC	T	Ouh-young, Ming, "Force Display in Molecular Docking," Dept. of Computer Science, Univ. of North Carolina, 1990, pp. i-viii, 1-12, 66-85.
<b>Examiner:</b> <i>Kurt C. [Signature]</i>		<b>Date Considered:</b> 8/11/00

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	<b>Applicant:</b> Salcudean, et al.	
	<b>Filing Date:</b> 5/7/99	<b>Group:</b> 2778



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**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub- Class	Filing Date
KE	A	5,757,358	5/26/98	Osga	345	146	6/5/95
KE	B	5,767,839	6/16/98	Rosenberg	345	161	3/3/95
KE	C	5,805,140	9/8/98	Rosenberg, et al.	345	161	11/17/95
KE	D	5,831,408	11/3/98	Jacobus, et al.	318	568.11	5/12/97
KE	E	5,844,392	12/1/98	Peurach, et al.	318	568.17	5/21/97
KE	F	5,880,714	3/9/99	Rosenberg, et al.	345	156	1/15/97
KE	G	6,037,927	3/14/00	Rosenberg	345	156	4/7/97
KE	H	6,046,727	4/4/00	Rosenberg, et al.	345	156	2/9/99
	I						
	J						
	K						

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	M							
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
KE	R	Hannaford, et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man and Cybernetics, Vol. 21, No. 3, May/June 1991, pp. 620-623, 631-633.
KE	S	Batter, et al., "GROPE-1: A Computer Display to the Sense of Feel," Proc. IFIP Congress 1971, pp. 759-763.
KE	T	Kilpatrick, Paul Jerome, "The Use of a Kinesthetic Supplement in an Interactive Graphics System," Dept. of Computer Science, Univ. of North Carolina, 1976, pp. 1-175.
<b>Examiner:</b> <i>Kent Ch...</i>		<b>Date Considered:</b> <i>8/11/00</i>

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  <i>(Use Several Sheets if Necessary)</i>	<b>Atty Docket No.:</b> IMM1P066.RE	<b>Application No.:</b> 09/307,023
	<b>Applicant:</b> Salcudean, et al.	
	<b>Filing Date:</b> 5/7/99	<b>Group:</b> 2778 Group 2700

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### U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date
	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
	I						
	J						
	K						

### Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation Yes	No
	L							
	M							
	N							
	O							
	P							

### Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
KC	R	Ouh-young, et al., "Creating an Illusion of Feel: Control Issues in Force Display," Dept. of Computer Science, Univ. of North Carolina, Sept. 1989, pp. 1-14.
	S	
	T	
<b>Examiner:</b> Kent Chang		<b>Date Considered:</b> 8/11/00

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.